FIELD SAMPLING PLAN
REVISION: 00

ASHLAND/NSP LAKEFRONT SUPERFUND SITE

ASHLAND, WISCONSIN

URS

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Ashland/NSP Lakefront Site – BRRTS# 02-02-000013

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List of Abbreviations

AC	Areas of Concern
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
ch. NR 141	WAC Chapter Natural Resources 141 – Groundwater Monitoring Well Requirements
ch. NR 600	WAC Chapter Natural Resources 600 – Hazardous Waste Rules
CFR	Code of Federal Regulations
CSTAG	Contaminated Sediment Technical Advisory Group
CTE	Central Tendency Exposure
DNAPL	Dense Non Aqueous Phase Liquid
DQO	Data Quality Objective
EPA	Environmental Protection Agency (USEPA)
ERA	Ecological Risk Assessment
FS	Feasibility Study for Remedial Action Options
HHRA	Human Health Risk Assessment
LNAPL	Light Non Aqueous Phase Liquid
MGP	Manufactured Gas Plant
MSL	Mean Sea Level
NAPL	Non Aqueous Phase Liquid
NET	Northern Environmental Technologies, Inc.
NSP	Northern States Power Company
PPE	Personal Protective Equipment
SEH	Short Elliott Hendrickson Inc.
TCLP	Toxicity Characteristic Leaching Procedure
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
WAC	Wisconsin Administrate Code
WDNR	Wisconsin Department of Natural Resources
WWTP	Wastewater Treatment Plant

1.0 INTRODUCTION

1.1 SITE DESCRIPTION

The Ashland/NSP Lakefront Superfund Site (the "Site") consists of property owned by Northern States Power Company, a Wisconsin corporation (d.b.a. Xcel Energy, a subsidiary of Xcel Energy, Inc. ("Xcel Energy")) a portion of Kreher Park, and sediments in an offshore area adjacent to Kreher Park. The Site is located within the City Limits of Ashland, and is bounded by Lake Shore Drive (also U.S. Highway 2) to the south, Prentice Avenue to the east, Ellis Avenue to the west and Chequamegon Bay to the north. The Site is located in Section 33, Township 48 north, range 4 west in Ashland County, Wisconsin, shown on Figure 1.

The Xcel Energy facility is located at 301 Lake Shore Drive East in Ashland, Wisconsin. The facility lies approximately 1,000 feet southeast of the shore of Chequamegon Bay of Lake Superior. The surface elevation at this location is approximately 640 feel MSL. The Xcel Energy property is occupied by a small office building and parking lot fronting on Lakeshore Drive, and a larger vehicle maintenance building and parking lot area located south of St. Claire Street between Prentice Avenue and 3rd Avenue East. There is also a gravel parking and storage yard area north of St. Claire Street between 3rd Avenue East and Prentice Avenue, and a second gravel storage yard at the northeast corner of St. Claire Street and Prentice Avenue. Residences bound the property east of the office building and the gravel parking area. Our Lady of the Lake Church and School is located immediately west the Xcel Energy property. Further west are private residences, beyond which is Ellis Avenue. Private homes are located immediately east of Prentice Avenue, along the eastern boundary of the Xcel Energy property. To the northwest, the Site slopes abruptly to the Wisconsin Central Limited Railroad property at a bluff that marks the former Lake Superior shoreline, and then to the City of Ashland's Kreher Park, beyond which is Chequamegon Bay. This portion of the Site is described as the Upper Bluff/Filled Ravine area. The Upper Bluff Area is shown on Figure 2.

The Kreher Park area consists of a flat terrace adjacent to the Chequamegon Bay shoreline. The surface elevation of the park varies approximately 10 feet, from 601 feet MSL, to about 610 MSL at the base of the bluff overlooking the park. The bluff rises to an elevation of about 640 feet MSL, which corresponds to the approximate elevation of the Xcel Energy property. The lake elevation fluctuates about two feet, from 601 to 603 feet MSL. At the present time, the park area is predominantly grass covered. A gravel overflow parking area for the marina occupies the west end of the property, while a miniature golf facility formerly occupied the east end of the property. The former City of Ashland wastewater treatment plant (WWTP) and associated structures fronts the bay inlet on the north side of the property. The impacted area of Kreher Park is bounded by Prentice Avenue and a jetty extension of Prentice Avenue to the east, the Wisconsin Central Limited (WCL) railroad to the south, the Ellis Avenue and the marina extension of Ellis Avenue to the west, and Chequamegon Bay to the north.

The offshore area with impacted sediments occupies approximately nine acres, and is located in an inlet created by the Prentice Avenue jetty and marina extensions previously described. For the most part, contaminated sediments are confined in the inlet bounded by the northern edge of the line between the Prentice Avenue jetty and the marina extension. Contaminated sediment levels fall off beyond this boundary. The affected sediments consist of lake bottom sand and silts, and are overlain by a layer of wood chips, likely originating from former lumbering operations. The chips layer varies in thickness from 0 to seven feet, with an average thickness of nine inches. The entire area of impacted sediments encompasses approximately nine acres.

1.2 SITE HISTORY AND BACKGROUND

Between 1885 and 1947, gas was generated for heating and lighting at a former manufactured gas plant (MGP) located at the Xcel Energy property. Manufactured gas plant wastes containing hazardous substances were released during the gas manufacturing process at the former MGP. The former MGP property was transected on the north by a ravine that ended at the historic shoreline of Chequamegon Bay. Historical maps show that the ravine was open at the startup of gas production at the former MGP in the late 1880s and was filled by the early 1900s.

The lakefront portion of the Site has been the location of historic industrial activities, and currently consists of an area owned by the City of Ashland generally known as Kreher Park. Kreher Park was created in the late 1800s and early 1900s by the placement of various fill materials into Chequamegon Bay. In the eastern portion of the former bay the fill material consisted mainly of sawdust and wood wastes from a series of sawmills that operated from the early 1880s until approximately 1939, most recently by the John Schroeder Lumber Company ("Schroeder Lumber"). Schroeder Lumber occupied the site from 1901 until 1939, when Ashland County took title to the site. Following Schroeder Lumber's tenure, Ashland County transferred title to the City of Ashland in 1942, which has owned the site since. During the 1940's and 50's, the City operated a waste disposal facility (landfill) in the present northwest portion of the park area. Beginning in 1951, the WWTP was constructed, and operated as the City's sewage treatment facility until 1989. During the mid-1980's, the marina extension of Ellis Avenue was completed, which created more usable land to permit establishment of a marina with full service boat slips, fuel and dock facilities and a ship store. In 1989 during exploratory work to expand the WWTP into the Kreher Park area, soil and groundwater contaminated with creosote/coal tar compounds were encountered. The City notified the Wisconsin Department of Natural Resources (WDNR), and subsequently closed the WWTP, relocating the current facility a few miles away to the northeast.

In 1994, the WDNR authorized Short Elliot Hendrickson (SEH) to initiate an investigation and evaluation of the area to characterize the extent of contamination at the in Kreher Park and offshore sediments adjacent to the Park. The affected sediments consist of lake bottom sand and silts, and are overlain by a layer of wood chips, likely originating from former lumbering operations. The chips layer varies in thickness from 0 to seven feet, with an average thickness of nine inches. The entire area of impacted sediments encompasses approximately nine acres.

Since 1995, Xcel Energy performed several investigations to characterize the extent of contamination in the buried ravine and Copper Falls Aquifer in the Upper Bluff Area. These investigations confirm that the ravine fill is a low permeability, mixed fill consisting of clays, cinders and rubble, with saturated conditions at depths varying from five feet below the service building, to about 20 feet at the north end of the gravel storage area. These investigations have also identified subsurface contamination resulting from historic MGP operations. Contamination exists as dissolved phase coal tar constituents in groundwater, and as "pools" of dense non-aqueous phase liquid (DNAPL) of coal tar by-product. Coal tar has been encountered at the base of the ravine and in the underlying Copper Falls Aquifer. In the ravine, coal tar varying from one to two feet in thickness is present at the base of the ravine from south of the service facility north to the area of St. Claire Street. In the upper Copper Falls Aquifer, coal tar has been encountered from south of the service facility north to the gravel parking and storage yard area north of St. Claire Street. It has also been measured in a piezometer installed on the Our Lady of the Lake church property west of Third Avenue East. Xcel Energy installed an interim action coal tar recovery system on its property to remove coal tar from the Copper Falls Aquifer during the summer/fall of 2000; the system became fully operational in January 2001. The coal tar recovery system consists of three extraction wells, an oil/water separator, and an on-site groundwater treatment system. Groundwater samples have been collected quarterly since the coal tar recovery system began operating, and results have been presented in progress reports. More than 5,000 gallons of coal tar has been removed, and nearly 750,000 gallons of contaminated groundwater has been treated between January 2001 and July 2003.

A distinct DNAPL pool varying in thickness up to five feet was present in the area around the seep located in Kreher Park just north of the mouth of the former ravine. A clay tile that discharged to the "seep" area (located north of the mouth of the buried ravine at the railroad)[1] was encountered at the base of the backfilled ravine during investigations completed between September and November 2001. Coal tar encountered in the shallow southern portion of the ravine near the former MGP building provides a source for contaminated groundwater flow, north through the former ravine into Kreher Park. However, the contaminant levels measured in wells screened in the ravine north of St. Claire Street are significantly lower than wells screened in the ravine south of St. Claire Street (where free-product coal tar is present), or at the seep. The buried clay tile likely behaved as a conduit for the migration of coal tar as well as contaminated groundwater. However, a significant portion of the clay tile was destroyed during the 2001 investigation activities. Xcel Energy performed a second interim remedial response during May 2002 to eliminate the seep area. Activities completed included the excavation of contaminated soil in the seep area, the placement of a low permeability cap over the seep area, and the installation of a groundwater extraction well installed at the base of the buried ravine. Contaminated groundwater collected near the mouth of the ravine via a fourth extraction well is conveyed to the on-site treatment system described above. (Figure 2 shows the location of the extraction wells, EW-1 through EW-4, and the treatment building located on the Xcel Energy property.)

1.3 SAMPLING OBJECTIVES

The overall goal of the RI/FS process is to collect sufficient data to characterize the extent of contamination at the Site and provide a feasibility study for a range of potential remedial options leading to the USEPA's selection of a proposed remedial action for the Site. The Site contains four affected areas of concern (ACs). These include two ACs on the Xcel Energy property (the

[1] The seep area had been the location of intermittent groundwater discharge containing a sheen and occasional odor of coal tar, until Xcel Energy performed the seep removal interim action in 2002.

Upper Bluff / Filled Ravine and Copper Falls Aquifer), the Kreher Park area, and the affected offshore sediments.

Additional site investigation data and historic site investigation data will be used to evaluate potential exposure pathways to review potential remedial alternatives protective of human health and the environment. Data collected during the RI, in addition to historic data, will be utilized to meet the specific objectives described in Section 1.2 of the RI/FS Work Plan.

The objectives of this FSP are to:

- Present the rationale for the number and types of environmental samples to be collected during the field investigation;
- Present the rationale for the selection of sampling locations;
- Describe the procedures to be used for collection, preservation, packaging, and transport of environmental samples;
- Describe the procedures to be used to perform a geophysical survey and video-logging of selected site wells;
- Present documentation requirements for sample activities and sample custody;
- Describe the procedures for decontamination of environmental sampling equipment;
- Describe the procedure for disposal of Investigative Derived Waste (IDW); and
- Provide a schedule for the field investigation.

This FSP is a stand-alone document that field personnel can rely on to collect the required samples without compromising the integrity of the samples or data. The information presented in this FSP will enable field personnel to collect the samples in a manner that meets project Data Quality Objectives (DQOs). Accordingly, the intent of this FSP is to provide the data required to implement the required program outlined in the RI/FS Work Plan for the Ashland/NSP Lakefront Superfund Site.

2.0 SAMPLE LOCATION AND FREQUENCY

2.1 UPPER BLUFF / FILLED RAVINE

2.1.1 Upper Bluff Area - Surface Soil Collection

Soil samples will be collected from unpaved areas around the former MGP facility to evaluate potential contamination within the surficial soils for the direct contact risk to human health. Soil sample locations SS-1 through SS-12 are shown on Figure 2. Samples SS-1 through SS-8 will be collected from unpaved areas in the vicinity of the former MGP facility and filled ravine area. Samples SS-9 through SS-12 will be collected within 15 feet of the north side of Lakeshore Drive. These four sample locations will be used to represent background conditions. The exact locations of these soil borings may differ in the field and are contingent on the accurate locating of underground utilities and safety of the field personnel (URS and subcontractor). All surface soil samples will be collected in accordance with Standard Operating Procedure (SOP) 140.

2.1.2 Upper Bluff Area - Subsurface Soil Sample Collection

The field investigation within the upper bluff and ravine fill area will include the collection of additional soil samples from Geoprobe soil borings advanced to the backfilled ravine and the collection of soil samples around the perimeter of the former MGP. The purpose of these samples is to investigate the known locations of the former gas holders and other potential sources at the former MGP. . The additional soil samples will be collected from approximately 38 Geoprobe borings advanced in a regular grid pattern south of St. Claire Street in the courtyard area, inside the portion of the Xcel Energy building between the courtyard and alley, and in the alley. Four borings will also be advanced inside the former MGP building south of well nest MW-8/8A. Soil sample locations are shown on Figure 2. Geoprobe borings will be advanced a minimum of five feet below the base of the filled ravine, or to a maximum depth of 20 feet. A minimum of three samples per boring will be collected for laboratory analysis. One sample will be collected from unsaturated zone. Field screening results will be used to collect a sample, which indicates the highest concentration of contamination or the base of the backfilled ravine if contamination is not encountered. The third sample will be collected from the deepest interval, or from the deepest interval where field screening indicates that contamination is not present.

Additional subsurface soil samples will also be collected from three Geoprobe borings to evaluate background conditions. Background subsurface soil samples will be collected at intervals of 5, 10, and 15 feet from three borings advanced on the Xcel Energy property south of the former MGP. These three borings will be advanced within 15 feet of the North side of Lakeshore Drive between Prentice and 3rd Avenues at locations 50, 100, and 150 feet west of Prentice Avenue. These three borings were selected to represent upgradient soil background conditions outside the limits of the filled ravine. Three samples per boring will be selected for laboratory analysis. The proposed subsurface sample locations are shown on Figure 2. All subsurface soil samples will be collected in accordance with SOP 140.

2.1.3 Upper Bluff Area - Groundwater Sample Collection

Groundwater will be sampled from 16 monitoring wells screened in the Miller Creek Formation or the filled ravine. The purpose of sampling these wells is to evaluate water quality and groundwater flow conditions at these locations. These wells include:

Miller Creek Formation Wells	Filled Ravine Wells
MW-8 MW-10 MW-11 MW-16 MW-17	MW-1 MW-7 MW-2 MW-9 MW-3 TW-13 MW-4 MW-14 MW-5 MW-15 MW-6

The locations of these wells are shown on Figure 2. The wells will be sampled quarterly for six rounds for this remedial investigation. The target parameters (field and laboratory analysis), and the frequency of monitoring is shown in Table 1. All groundwater samples will be collected in accordance with SOP 150.

2.1.4 Upper Bluff Area - Soil Gas Vapor Collection

Soil gas vapor samples will be collected from seven vapor probes that will be installed at the following locations:

- From vapor monitoring probe VP-1 installed in the filled ravine area east of the Xcel Energy building near the southeast corner of the asphalt parking lot;
- From vapor monitoring probes VP-2S and VP-2D installed in the filled ravine along St. Clair Street north of the paved courtyard area;
- From vapor monitoring probes VP-3S, VP-3I, and VP-3D installed near well MW-2R in the Xcel Energy storage yard north of St. Claire Street; and
- From vapor probe VP-4 installed east of MW-2R and approximately 25-feet east of the edge of the filled ravine.

These samples will be collected to evaluate the potential inhalation pathway for exposure to hazardous vapors generated at the site. Two rounds of sampling will be conducted, one during the summer and the second during the winter. Grab samples will be collected from soil vapor probes located at the Site. The sample locations are shown on Figure 2. These air samples will be collected in accordance with SOP 200.

2.1.5 Upper Bluff Area - Indoor Air Sample Collection

Vapor intrusion samples will be collected from inside the Xcel Energy service center building from the lowest elevation adjacent to an exterior wall near well MW-15. A background sample will be collected near MW-15 to evaluate ambient air conditions at the Site. These samples will be collected to evaluate the potential inhalation pathway for exposure to hazardous vapors generated at the site. Two rounds of sampling will be conducted, one during the summer and the second during the winter. These air samples will be collected in accordance with SOP 200.

2.2 COPPER FALLS AQUIFER

2.2.1 Copper Falls Aquifer – Piezometer Installation

Six additional piezometers will be installed in the Copper Falls Aquifer at the following locations:

- MW-7B will be installed adjacent to MW-7A in the former seep area at a depth of 55 feet below ground surface (bgs) (20 feet deeper than MW-7A);

- MW-23A will be installed in Kreher Park north of MW-21A and west of MW-7A. Piezometer MW-23A will be installed at the Miller Creek / Copper Falls interface at an approximate depth of 35 feet bgs.

- Piezometer MW-23B will be installed in Kreher Park adjacent to MW-23A at a depth 20 feet deeper than MW-23B (approximately 55 feet bgs).

- MW-24A will be installed in Kreher Park near the intersection of Ellis Avenue and Marina Drive between Marina Drive and the Chequamegon Bay inlet shoreline. Piezometer MW-24A will be installed at the Miller Creek / Copper Falls interface at an approximate depth of 35 feet bgs.

- MW-25A will be installed in Kreher Park near the center of Kreher Park between Marina Drive and the Chequamegon Bay inlet shoreline. Piezometer MW-25A will be installed at the Miller Creek / Copper Falls interface at an approximate depth of 35 feet bgs.

- MW-26A will be installed in Kreher Park on the north side of the former waste water treatment plant between the former plant and the Chequamegon Bay inlet shoreline. Piezometer MW-26A will be installed at the Miller Creek / Copper Falls interface at an approximate depth of 35 feet bgs.

All drilling, well installation, and well development will be completed in accordance with ch. NR 141 requirements.

2.2.2 Copper Falls Aquifer – Groundwater Sample Collection

Following piezometer installation, groundwater will be sampled from 41 piezometers screened in the Copper Falls aquifer. The purpose of these samples is to better define the extent of the free product plume and provide additional information on the down gradient extent of the dissolved phase plume. These wells include:

Copper Falls Aquifer Piezometers

MW-2AR	MW-5B	MW-9A	MW-13C	MW-18B	MW-22A	MW-26A*
MW-2BR	MW-5C	MW-9B	MW-13D	MW-19A	MW-22B	MW-2A(NET)
MW-2C	MW-6A	MW-10A	MW-15A	MW-19B	MW-23A*	MW-2B(NET)
MW-4A	MW-7A	MW-10B	MW-15B	MW-20A	MW-23B*	AW-1
MW-4B	MW-7B*	MW-13A	MW-17A	MW-21A	MW-24A*	AW-1
MW-5A	MW-8A	MW-13B	MW-18A	MW-21B	MW-25A*	

- RI/FS Proposed Well

The locations of these wells are shown on Figure 2 and Figure 3. The wells will be sampled quarterly for six rounds for this remedial investigation. The target parameters (field and laboratory analysis), and the frequency of monitoring is shown in Table 1. All groundwater samples will be collected in accordance with SOP 150.

2.2.3 Copper Falls Aquifer – Borehole Geophysical Survey and Well Casing Inspection

A borehole geophysical survey will be performed to verify subsurface geologic conditions. The geophysical survey will be conducted using a natural gamma survey and an induction log (electromagnetic conductivity) survey on wells MW-2RB/MW-2C located in the Upper Bluff Area and MW-2A (NET) located in Kreher Park.

Well casings for artesian wells AW-1 and AW-2 will also be visually inspected and recorded on videotape with the aid of a down-hole video camera. The purpose of this inspection is to:

- Determine the depth of the well;
- Determine the length and depth of the well screen; and
- Observe the condition of the well casing and screen.

Depending on the results of this camera survey, borehole geophysical surveys may also be completed on artesian wells AW-1 and AW-2. (If metal casing was used to construct wells AW-1 and AW-2, the borehole geophysical surveys will not be completed because the metal casing will interfere with the geophysical survey.) The borehole geophysical survey and visual inspection of the wells located in Kreher Park is contingent upon obtaining access from the City of Ashland. Fromm Applied Technology of Mequon, Wisconsin will perform the geophysical survey.

2.3 KREHER PARK

2.3.1 Kreher Park – Well Installation

Four additional water table monitoring wells will be installed in Kreher Park in the upper most water bearing unit. Wells will be installed at the following locations.

- MW-7R will be installed adjacent to piezometers MW-7A/MW-7B in the former seep area at an approximate depth of 15 feet bgs;

- MW-24 will be installed in Kreher Park near the intersection of Ellis Avenue and Marina Drive between Marina Drive and the Chequamegon Bay inlet shoreline adjacent to piezometer MW-24A at an approximate depth of 15 feet bgs;

- MW-25 will be installed in Kreher Park near the center of Kreher Park between Marina Drive and the Chequamegon Bay inlet shoreline adjacent to piezometer MW-25A at an approximate depth of 15 feet bgs; and

- MW-26 will be installed in Kreher Park on the north side of the former wastewater treatment plant between the former plant and the Chequamegon Bay inlet shoreline adjacent to piezometer MW-26A at an approximate depth of 15 feet bgs.

Small diameter shallow piezometers P-24, P-25, and P-26 will also be installed adjacent to well nests MW-24/MW-24A, MW-25/MW-25A, and MW-26/MW-26A, respectively. These wells will be used to monitor the piezometric conditions at the site. All drilling, well installation, and well development will be completed in accordance with ch. NR 141 requirements.

2.3.2 Kreher Park – Groundwater Sample Collection

Groundwater will be sampled from ten monitoring wells screened in the Kreher Park fill aquifer. The purpose of these samples is to provide additional information of both the flow and contaminant mass-loading to surface water. These wells include:

Kreher Park Wells	
MW-1 (NET)	TW-11
MW-2 (NET)	TW-12
MW-3 (NET)	MW-24*
MW-7R*	MW-25*
TW-9	MW-26*

* RI/FS Proposed Well

The locations of these wells are shown on Figure 3. The wells will be sampled quarterly for six rounds for this remedial investigation. The target parameters (field and laboratory analysis), and the frequency of monitoring is shown in Table 1.

2.3.3 Kreher Park - Exploration Test Pits

Exploration test pits will be excavated at Kreher Park to further characterize the limits of fill for the solid waste disposal and the former coal tar dump areas. Two test pits will be excavated on each side of the former solid waste disposal area (8 total), and two test pits will be excavated across a former open sewer in this area. Test pits will also be excavated in the vicinity of the former coal tar dump to determine the lateral extent of contamination in this area. Two test pits will be excavated on the east and west sides, two in the center, one on the north side, and one on the south side of the former coal tar dump area (8 total). Additionally, three test pits will be excavated across former drainage ditches/culverts. As shown on Figure 3, a former open sewer drainage swale is located in the solid waste disposal area, a former culvert/trench is located beneath the southwest corner of the wastewater treatment plant north of the former coal tar dump, and a trench is located east of the former treatment plant. Proposed test pit locations are also shown on Figure 3.

Each test pit will be excavated to a depth between 6 and 8 feet. Material encountered in each test pit will be visually described, and photographed as needed. Test pits will be terminated when the limits of fill have been determined, or until obstructions or caving prevent additional excavation. Material removed from the test pits will be returned to the excavation. Grab samples of obvious solid waste material from the test pits will be collected, preserved and shipped for analysis for the Table 1 parameters. Based on these results, selected samples will be subjected to Toxicity Characteristic Leaching Procedure (TCLP) analyses for potential hazardous waste classification.[2] Test pit soil samples will be collected in accordance with the SOP 140.

2.3.4 Kreher Park - Subsurface Soil

Approximately 12 Geoprobe borings will be advanced in the vicinity of the former seep area, and approximately 8 borings will be advanced in the vicinity of well TW-11; additional borings will be advanced as needed. The purpose of these samples is to identify the lateral extent of free-phase hydrocarbons in these areas. The proposed subsurface soil sample locations are shown on Figure 3. All subsurface soil samples will be collected in accordance with the SOP 140.

2.4 CHEQUAMEGON BAY INLET

In accordance with agreements made at the Technical Scoping meeting, two alternatives are presented for the investigation of the affected sediments. The first of these includes the following sampling design strategy:

- Implementing a sediment Triad design strategy that will evaluate chemical, biological and toxicological indices for sediment dwelling organisms; these lines of evidence supplement traditional sediment analytical data to provide a site-specific risk assessment; studies of the benthic community, pore-water and sediment chemistry and substrate toxicity will be performed. A total of 12 sampling stations within the affected area, along with four reference stations outside the area are tentatively recommended (a reconnaissance survey will be initially performed to finalize sample stations);

[2] If obstructions or caving prevents the collection of soil samples from test pits, a Geoprobe® drill rig will be mobilized to collect soil sample from borings advanced at the same location. Additionally, if free-phase hydrocarbons are observed in any test pit (e.g. sheen), test pits will be stepped out until no free product is encountered.

- Collecting fish tissue samples to support a baseline human health risk assessment (HHRA);

- Implementing a sediment stability analysis that will include both a quantitative (modeling) and an empirical evaluation of sediment stability as recommended by USEPA; the purpose of this study will be to determine if existing sediment is naturally being eroded or buried; the results of the study will be used to apply to remedial analyses; and

- Conducting a baseline ecological risk assessment integrating the data developed from the Triad studies to further define the nature and extent of contamination from contaminants of concern (COCs) to historical sources.

The second alternative for study of the affected sediments recommends implementation and continuation of a problem formulation process with the active participation of all affected stakeholders. This process has been recommended both by USEPA in its recent Management of Contaminated Sediment Sites guidance (2002) and by USEPA's Contaminated Sediment Technical Advisory Group (CSTAG) following its Ashland visit in July 2002. As outlined, this approach recommends convening stakeholders in a series of workshops with the intent of finalizing a sampling strategy that will satisfy all parties.

A detailed sampling design strategy has been presented in Section 4.2.2 of the RI/FS Work Plan. A final Sediment Quality Triad sampling plan will be submitted for Agency review following the completion of a site reconnaissance to finalize sample locations (see Section 4.2.2). Proposed sample locations are shown on Figure 4.

3.0 DATA COLLECTION PROCEDURES

3.1 MOBILIZATION AND SITE ACCESS

3.1.1 Pre-investigation Activities

Much of the field investigation activities will take place intermittently over the course of an 18-24 month span. To reduce potential problems in the field, the following tasks, at a minimum, should be completed before conducting field activities:

- Discuss scheduled sampling activities with the Xcel Energy Project Coordinator. The Project Coordinator is required to notify USEPA no less than 14 days prior to sample collection;
- Contact laboratory to review analytical requirements, provide sample containers, and discuss delivery/pickup of coolers/packages;
- Contact subcontractors to review scope of work, schedule field activities, and discuss special equipment needs;
- Contact Diggers Hotline if drilling/excavating activities are scheduled;
- Receive permission to access privately/City of Ashland owned properties;
- Secure specialized equipment needed to complete field activities; and
- Review scope of work with Project Manager to identify potential problems.

3.1.2 Site Access

Site access is of the utmost importance to protect the public from exposure to contaminants at the site during field investigation activities. All visitors must check in with the Field Manager before being allowed on-site. Visitor information (i.e. affiliation, reason for being at site, etc.) will be documented in the field notebook. Unpermitted visitors will not be allowed on-site. Visitors will not be allowed to enter the exclusion zone without permission from the Project Manager. All personnel entering the site will review the Site Health and Safety Plan (HASP).

A portion of the field investigation is taking place at the Our Lady of the Lake School/Church property. It is crucial that the field manager coordinate with representatives of the School before commencing field activities, to minimize disturbance to the students. If possible, field activities should be scheduled when students are not using the property. For all field activities at this property, the exclusion zone will be secured with either traffic cones or caution tape.

Additionally, field investigation activities are taking place at Kreher Park. This area is used by the public for recreational purposes. For all field activities at Kreher Park, the exclusion zone will be secured with either traffic cones or caution tape. Excavations advanced at Kreher Park will be backfilled before the end of the day to eliminate the possibility of exposure to contaminants when work is not taking place.

3.1.3 Field Standard Operating Procedures

Standard operating procedures (SOP) referenced in this document are listed below. The individual SOPs are included in Appendix A.

SOP Number	Description
100	Water Level Measurement
110	pH Measurement
120	Conductivity Measurement
130	Temperature Measurement
140	Soil Sample Collection
150	Groundwater Sample Collection
160	VOC, SVOC, and Inorganic Sample Collection
170	Field Filtering Groundwater Samples
180	Quality Control Sampling
190	Decontamination of Sampling Equipment
200	Summa Canister VOC Sample Collection
210	Shipping Environmental Samples
220	Decontamination of Heavy Equipment
230	Fish Tissue Sample Collection
240	Sediment Sampling for Toxicity and Benthic Community Analysis
250	Sediment Sampling for Chemical and Physical Parameter Testing
260	Field Screening Procedures
270	Non-Aqueous Phase Liquid Measurement
280	Ponar Sampling
290	Vibracore Sediment Sampling
300	Sediment Sampling for Pore Water Analysis

3.2 SURFACE SOIL

3.2.1 Sampling Equipment

Surface soil samples will be collected using hand tools, clean spatulas, a scale for weighing samples and laboratory supplied containers. Surface borings will be advanced using hand augers or hand tools. A comprehensive list of equipment needed is described in SOP 140. Sampling equipment will be decontaminated between boring locations. Decontamination procedures are described in SOP 190.

3.2.2 Sample Collection

All details regarding soil vapor sample collection will be recorded in the field notebook. At each surficial soil sample location for direct contact conditions, soil will be collected from a depth between 3 and 12 inches utilizing hand tools. Procedures for soil sample collection are described in SOP 140. A photoionization detector (PID) should be used to measure the concentration of organic vapors in each sample. Procedures for field screening are described in SOP 260.

3.2.3 Sample Containerization

Soil samples will be placed in appropriate laboratory supplied containers. Samples be placed in containers and preserved in accordance with the analytical requirements listed in Table 1. Procedures for filling laboratory containers are described in SOP 160.

3.2.4 Sample Handling and Analysis

Proper field sampling documentation, and field analytical and laboratory documentation helps to ensure sample authenticity and data integrity. Section 4.2 of this FSP describes the methods for assigning unique sample names. The unique sample name will be used for the sample containers and chain of custody. Procedures for sample shipping are described in SOP 210. Analyses required for surface soil samples are listed on Table 1. Northern Lake Service, of Crandon, Wisconsin will provide soil analytical services.

3.3 SUBSURFACE SOIL

3.3.1 Sampling Equipment

Subsurface soil samples will be collected using direct-push techniques (Geoprobe). Required sampling equipment includes: clean spatulas, a scale for weighing samples and laboratory supplied containers. A comprehensive list of equipment needed is listed in SOP 140. Sampling equipment will be decontaminated between boring locations. Decontamination procedures are described in SOP 190.

3.3.2 Sample Collection

All details regarding subsurface soil sample collection will be recorded in the field logbook. Geoprobe borings will be advanced a minimum of five feet below the base of the filled ravine, or to a maximum depth of 20 feet in the Upper Bluff/Ravine area, and to the underlying clay layer (Miller Creek formation) or to a maximum depth of 15 feet in the Kreher Park area. Soil samples will be collected continuously and visually classified by a geologist or qualified geological engineer. Representative samples will be collected at two-foot intervals for field screening. Samples submitted for laboratory analysis will be selected at the rate of one sample for every 10 feet of drilling. Procedures for soil sample collection are described in SOP 140.

3.3.3 Field Screening Procedures

Samples will be collected every two feet and screened with a photo-ionization detector (PID) equipped with a 10.6 eV lamp. The field screening results will be used to select soil samples for laboratory analysis. Procedures for field screening are described in SOP 260.

3.3.4 Sample Containerization

Soil samples will be placed in appropriate laboratory supplied containers. Samples be placed in containers and preserved in accordance with the analytical requirements listed in Table 1. Procedures for filling laboratory containers are described in SOP 160.

3.3.5 Sample Handling and Analysis

Proper field sampling documentation, and field analytical and laboratory documentation helps to ensure sample authenticity and data integrity. Section 4.2 of this FSP describes the methods for assigning unique sample names. The unique sample name will be used for the sample containers and chain of custody. Procedures for sample shipping are described in SOP 210. Analyses required for subsurface soil samples are listed on Table 1. Northern Lake Service, of Crandon, Wisconsin will provide soil analytical services.

3.4 SOIL VAPOR

3.4.1 Soil Vapor Probe Installation

Seven soil vapor probes will be installed during this remedial investigation. Details regarding soil vapor probe construction are described in Section 5.3.1.2 of the RI/FS Workplan.

3.4.2 Sampling Equipment

Sampling equipment needed to collect vapor intrusion samples includes 6 L passivated Summa canisters, Teflon tubing and inline particulate filters. A comprehensive list of equipment needed is listed on SOP 200.

3.4.3 Sample Collection

All details regarding soil vapor sample collection will be recorded in the field notebook. Additionally, sample information will be recorded on the canister sampling collection form. The soil vapor sample is a grab sample and does not require the use of a regulator. The valve cap on the Summa canister is removed and the particulate filter is then connected inline to the valve stem. Teflon tubing is used to connect the particulate filter to the vapor probe wellhead. The canister valve is opened and allowed to fill. The canister should equilibrate within one to two minutes (no audible sound of rushing gas). Once the canister has equilibrated, the canister valve is closed and the valve cap replaced. Procedures for soil vapor sample collection are described in SOP 200.

3.4.4 Sample Handling and Analysis

Once collection of the soil vapor sample is complete and the cap is replaced on the canister valve, a canister tag will be filled out and attached to the canister. The tag will detail the sample ID and other pertinent information. The canister will be shipped to the laboratory in the same packaging as it was shipped. A laboratory chain of custody will be filled out and accompany the samples during shipment. The hold time for TO-15 analysis is 30 days.

For this RI, the soil vapor samples will be analyzed for VOCs using method TO-15. A list of analytes for the TO-15 analysis is listed in Table 1. Severn Trent Laboratory of Knoxville, Tennessee will perform soil vapor analytical services.

3.5 VAPOR INTRUSION

3.5.1 Sampling Equipment

Sampling equipment needed to collect vapor intrusion samples includes 6 L passivated Summa canisters, 24 hour regulators, and inline particulate filters. A comprehensive list of equipment needed is listed on SOP 200.

3.5.2 Sample Collection

All details regarding vapor intrusion sample collection will be recorded in the field notebook. Additionally, sample information will be recorded on the canister sampling collection form. The sample will be collected over a period of 24 hours using a regulator. The regulator is used to provide a time weighted average (TWA) sample by restricting the flow rate of air entering the canister. The valve cap on the Summa canister is removed and the regulator is connected to the valve. A particulate filter is then connected inline to the regulator. The canister valve is then opened and the start time recorded in the field notebook. For the vapor intrusion samples, a sample interval of approximately 24 hours is required. Once 24 hours has passed, the canister valve is closed and the valve cap replaced. The end time will then be recorded in the field logbook. Procedures for vapor intrusion sample collection are described in SOP 200.

3.5.3 Sample Handling and Analysis

Once collection of the vapor intrusion sample is complete and the cap is replaced on the canister valve, a canister tag will be filled out detailing the sample ID, sample duration, regulator type and other pertinent information. This tag is then attached to the canister. The canister will be shipped to the laboratory in the same packaging as it was shipped. A laboratory chain of custody will be filled out and accompany the sample during shipment. The hold time for TO-15 analysis is 30 days.

For this RI, the vapor intrusion samples will be analyzed for VOCs using method TO-15. A list of analytes for the TO-15 analysis is listed in Table 1. Severn Trent Laboratory of Knoxville, Tennessee will perform analytical services.

3.6 GROUNDWATER

3.6.1 Monitor Well Installation

Fourteen additional monitoring wells and piezometers will be installed during this remedial investigation. Four of these piezometers were installed in December 2003. Details regarding well construction are described in Section 5.3 of the RI/FS Workplan.

3.6.2 Well Development

The installed wells will be developed in accordance with NR 141 Wisconsin Administrative Code requirements. Wells will be developed using decontaminated or dedicated sampling equipment to reduce the possibility for cross contamination. Additional information regarding well development is described in Section 5.3 of the RI/FS Workplan.

3.6.3 Sampling Equipment

Each well will be purged with a dedicated or decontaminated bailer or submersible pump. A comprehensive list of sampling equipment needed is listed on SOP 150.

3.6.4 Sample Collection

All details regarding subsurface groundwater sample collection will be recorded in the field logbook. The condition of the well will also be recorded at the time of sample collection. Groundwater samples will be collected from the monitoring wells listed in Sections 2.1.5, 2.2.1 and 2.3.4 of this Field Sampling Plan. The procedure for collecting groundwater samples is described in SOP 150.

Prior to sample collection, static water levels will be measured in all site wells with a water level indicator. The procedures for using the water level indicator are described in SOP 100.

Wells suspected to contain non-aqueous phase liquids (NAPLs) should be measured prior to sample collection. SOP 270 describes procedures for measuring NAPLs. Wells containing more than one foot of NAPL will not be sampled.

Each well will be purged with a dedicated/decontaminated bailer or submersible pump. Each well will be purged until at least four times the volume of water in the well has been removed. Additionally, field measured parameters must stabilize for purging to be complete. At least three consecutive readings spaced approximately 2 minutes, or 0.5 well volumes or more apart, are within the following ranges for the following indicator parameters:

- Specific Conductance — ± 5.0 µmhos/cm for values <1000 µmhos/cm; ±10.0 µmhos/cm for values >1000 µmhos/cm
- pH — ±0.1 pH units
- Temperature — ±0.1 ºC
- Dissolved Oxygen — ±0.2 mg/L

For low permeability formations, purging will continue until the well is dry. If time permits, the well will be allowed to recover completely and bail dry a second time. Purge volumes and the color, odor, and turbidity of each will be noted on field sampling forms. The condition of the well will also be recorded at the time of sample collection. The procedures for determining pH, specific conductance, and temperature are detailed in SOPs 110, 120, and 130.

3.6.5 Sample Containerization

Groundwater samples will be placed in appropriate laboratory supplied containers. Samples will be placed in containers and preserved in accordance with the analytical requirements listed in Table 1. Procedures for filling laboratory containers are described in SOP 160. Samples submitted for dissolved analytes will need to be field filtered prior to placement in containers. Procedures for field filtering are described in SOP 170.

3.6.6 Sample Handling and Analysis

Proper field sampling documentation, and field analytical and laboratory documentation helps to ensure sample authenticity and data integrity. Section 4.2 of this FSP describes the methods for assigning unique sample names. The unique sample name will be used for the sample containers and chain of custody. Procedures for sample shipping are described in SOP 210. Analyses required for surface soil samples are listed on Table 1. Northern Lake Service, of Crandon, Wisconsin will provide soil analytical services.

3.7 GEOPHYSICAL SURVEY

3.7.1 Procedure

Borehole geophysics will be performed to verify subsurface geologic conditions. Fromm Applied Technology of Mequon, Wisconsin will perform the geophysical survey. The geophysical survey will be conducted using a natural gamma survey and an induction log (electromagnetic conductivity) survey on wells MW-2C, MW-2A (NET), AT-1 and AT-2. The geophysical survey of the wells located at Kreher Park is contingent on obtaining access from the City of Ashland.

3.8 VIDEO LOGGING

3.8.1 Procedure

A down-hole video camera will be used to visually inspect the well casings for the two artesian wells located at Kreher Park, AT-1 and AT-2. Fromm Applied Technology of Mequon, Wisconsin will perform video logging services. The purpose of this inspection is to:

- Determine the depth of the well;
- Determine the length and depth of the well screen; and
- Observe the condition of the well casing and screen.

This inspection is contingent on obtaining access to the wells from the City of Ashland. The visual inspection will be recorded on videotape.

3.9 EXPLORATION TEST PITS

A test pit is an opening in soil, unconsolidated deposit, or bedrock having at least one lateral dimension greater than the depth of the opening, which is used for scientific purposes. The location of each test pit shall be coordinated in writing with the City of Ashland before digging begins. The contractor shall follow Occupational Safety and Health Administration (OSHA) rules for excavation and confined space entry. The excavated material shall be screened for hazardous properties. Nonhazardous excavated material shall be backfilled immediately after the required information has been recorded. The first soils out shall be the last in when filling the pit. No test pit shall be left open overnight unless adequate safety precautions are employed. In vegetated areas, backfilled test pits shall be restored with seed and straw mulch. In addition to the general information required for all field activities listed in Section 4.1, the following shall be recorded for each test pit:

1. The total depth, length, and width;
2. The depth and thickness of distinct soil or lithologic units;
3. A lithologic description of each unit; and
4. A description of any man-made materials or apparent contamination encountered.

Excavation shall occur by using either a backhoe or hand shovel. Decontamination of all equipment shall occur after an excavation is completed or daily following the procedures described in Section 5.0. Any shoring that is required shall be described and documented.

3.9.1 Sampling Equipment

Soil samples will be collected from the bottom of the test pits using hand tools, clean spatulas, and a scale for weighing samples and containers

3.9.2 Sample Collection

All details regarding exploration test pit soil sample collection will be recorded in the field logbook. The test pits will be advanced using an excavator. One grab sample of obviously contaminated soil will be collected from each test pit for laboratory analysis. Procedures for soil sample collection are described in SOP 140.

3.9.3 Sample Containerization

Soil samples collected from the test pits will be placed in appropriate laboratory supplied containers. Samples be placed in containers and preserved in accordance with the analytical requirements listed in Table 1. Procedures for filling laboratory containers are described in SOP 160.

3.9.4 Sample Handling and Analysis

Proper field sampling documentation, and field analytical and laboratory documentation helps to ensure sample authenticity and data integrity. Section 4.2 of this FSP describes the methods for assigning unique sample names. The unique sample name will be used for the sample containers and chain of custody. Procedures for sample shipping are described in SOP 210. Analyses required for subsurface soil samples are listed on Table 1. Northern Lake Service, of Crandon, Wisconsin will provide soil analytical services. All analyses on soil collected from the test pits will be performed as TCLP for potential hazardous waste characterization.

3.10 SEDIMENT AND BETHIC COMMUNITY

The sediment triad sampling will evaluate chemical, biological and toxicological indices for sediment dwelling organisms to support the ecological risk assessment (ERA). Three parameters will be assessed as part of this sampling effort:

- Benthic Community;
- Sediment and Pore Water Chemistry and;
- Substrate Toxicity.

Procedures for toxicity testing and benthic community analysis are described in SOP 240. Procedures for sediment chemical and physical parameter testing are described in SOP 250. Procedures for sediment pore water analysis are described in SOP 300.

3.10.1 Sampling Equipment

Sampling equipment needed to collect the samples includes a boat, Ponar sampler or coring device, and sample containers. A comprehensive list of sampling equipment is listed in the SOPs referenced in Section 3.10 of this FSP.

3.10.2 Sample Collection

All details regarding sample collection will be recorded in the field notebook. Samples will be collected using either a Ponar sampler or a Vibracore. Procedures for Ponar sampling are described in SOP 280. Procedures for Vibracore sampling are described in SOP 290. Specific sampling requirements for benthic community, sediment and pore water chemistry, and substrate toxicity samples are described in SOPs 240, 250, and 300.

3.10.3 Sample Handling and Analysis

Proper field sampling documentation and field analytical and laboratory documentation helps to ensure sample authenticity and data integrity. Section 4.2 of this FSP describes the methods for assigning unique sample names. The unique sample name will be used for the sample containers and chain of custody. Procedures for sample shipping are described in SOP 210. Analyses required for the samples are listed on Table 1. The laboratory providing analytical services will be identified later

3.11 FISH TISSUE

Fish tissue samples will be collected for testing of analytical chemistry, percent moisture and percent lipids. The analytical data from this testing will be used to support the HHRA and ERA. Procedures for fish tissue sample collection are described in SOP 230.

3.11.1 Sampling Equipment

Sampling equipment needed to collect fish tissue samples includes a boat, collection equipment, and sample containers. A comprehensive list of sampling equipment is listed in SOP 230.

3.11.2 Sample Collection

All details regarding fish tissue sample collection will be recorded in the field notebook. Additionally, sample information will be recorded on the field record form. Three species of fish will be selected for tissue sample collection, smelt, and two higher trophic level species. Smelt will be collected using seine nets. The other species will be collected using a boat-mounted electrofishing unit. Procedures for fish tissue sample collection are described in SOP 230.

3.11.3 Sample Handling and Analysis

Proper field sampling documentation and field analytical and laboratory documentation helps to ensure sample authenticity and data integrity. Section 4.2 of this FSP describes the methods for assigning unique sample names. The unique sample name will be used for the sample containers and chain of custody. Procedures for sample shipping are described in SOP 210. Analyses required for fish tissue samples are listed on Table 1. The laboratory providing fish tissue analytical services will be identified later.

3.12 QA/QC SAMPLES

Procedures for collecting QA/QC samples are described on SOP 180.

3.12.1 Duplicate Samples

Duplicate samples will be collected from selected soil and groundwater sample locations at a frequency of one sample for every 10 investigative samples submitted for laboratory analysis. Section 4.2 of this FSP describes the methods for assigning unique sample names. The unique sample name will be used for the sample containers and chain of custody. Samples will be placed in laboratory-supplied containers and preserved in accordance with the analytical requirements listed in Table 1. Procedures for filling laboratory containers are described in SOP 160. Samples submitted for dissolved analytes will need to be field filtered prior to placement in containers. Procedures for field filtering are described in SOP 170.

3.12.2 Replicate Samples

Replicate samples include matrix spike and matrix spike duplicates (MS/MSD). One MS/MSD sample will be collected for every 20 samples submitted for laboratory analysis. The volume of groundwater collected at each of the locations where MS/MSD samples will be obtained will require double the sample volume for each organic and inorganic analysis. Soil sample volumes for VOC analysis will be sufficient to run MS/MSD analyses. No additional volume is required. One additional volume of soil will be required for all other chemical analyses. Section 4.2 of this FSP describes the methods for assigning unique sample names. The unique sample name will be used for the sample containers and chain of custody. Samples will be placed in laboratory-supplied containers and preserved in accordance with the analytical requirements listed in Table 1. Procedures for filling laboratory containers are described in SOP 160. Samples submitted for dissolved analytes will need to be field filtered prior to placement in containers. Procedures for field filtering are described in SOP 170.

3.12.3 Trip Blanks

Trip blanks will be included with each shipping container that contains soil or groundwater samples to be analyzed for VOCs. Each trip blank will consist of one 40ml glas vial containing de-ionized water preserved with 1:1 HCl that has been prepared by the laboratory. Section 4.2 of this FSP describes the methods for assigning unique sample names. The unique sample name will be used for the sample containers and chain of custody.

3.12.4 Equipment Blanks

Equipment blanks will be collected following decontamination of the soil sampling equipment (split spoon sampler, hand augers, knives). No equipment blanks associated with groundwater sampling will be collected since dedicated sampling equipment will be used for all sample locations.

One equipment blank will be collected for every 10 soil samples submitted to the laboratory with a minimum of one equipment blank per sampling crew per day. Following decontamination of the equipment, deionized water will be poured over selected sampling equipment and collected for laboratory analysis. The equipment blanks will be analyzed for the constituents of concern at the sample location where the equipment blank was obtained.

3.13 FIELD SURVEYING

3.13.1 Horizontal and Vertical Control

All RI sample locations will be surveyed by a State of Wisconsin, Registered Land Surveyor. Nelson Surveying, Inc. of Ashland, Wisconsin will perform survey services at the Site. Horizontal control is based on Wisconsin State Plane – North datum. Elevation measurements are based on National Geodetic Vertical Datum (NGVD) 1929. This coordinate system will be used for establishing horizontal and vertical control to sampling data. The survey data will be entered into the Site GIS database, managed by Newfields.

3.13.2 Data Acquisition

Surveying activities at the Site will be conducted by Nelson Surveying. A minimum of two control points will be established at the site upon which the State Plane coordinates and elevation are set. These points will be established in a permanent location where they will not be disturbed.

Measured elevations will be tied to existing Site control points, and referenced to NGVD29 elevations. Measured horizontal locations will be tied to the existing Site control points in the

Wisconsin State Plane – North system. Horizontal orientation locations will be accurate to ±0.1 feet and vertical orientation elevations accurate to ±0.01 feet.

3.13.3 Historic Survey Data

Historic sample locations have been surveyed based on an arbitrary coordinate system established by SEH during investigation activities completed for WDNR. The coordinate data associated with these historic samples will be converted to agree with the coordinate system established for this RI, described in Section 3.14.1.

4.0 SAMPLE DESIGNATION

4.1 LOGBOOKS

Dedicated bound field logbooks will be maintained by each Field Manager. Entries will be described in as much detail as possible so that events can be reconstructed without reliance on memory. All entries in the logbook will be made with blue or black ink. Entries into the logbook will contain a variety of information regarding field activities at the Site. Each daily entry will begin with the following information:

- Date;
- Log open time;
- Title;
- Purpose and description of field activities;
- Weather;
- Field personnel; and
- Equipment used.

The sampling representative will date and sign each activity on the day completed. Corrections will be made by drawing a single line through the incorrect entry, entering the correct information, and initialize and dating the change. At the end of each day, the sampler or Field Manager will sign and enter the time after the last entry is made (log closed time).

All measurements made, photographs taken, and samples collected will be entered into the notebook. The notebook will contain a sufficient amount of information to distinguish each sample, photograph, or measurements from the others. That information will include:

- Project name;
- Unique, sequential field sample number;
- Matrix sampled;
- Sample depth;
- Sampling date and time;
- Specific sample location in sufficient detail to allow re-sampling at the same location;

- Sampling methods and/or reasons for modifications to standard operating procedures;
- Preservation techniques, including filtration, as appropriate to sample type;
- Analysis to be performed;
- Significant observations made during the sampling process;
- Results of any field measurements;
- Photograph number, roll number, and photograph description;
- Printed name and signature of persons performing the field sampling; and
- Date and time of shipment, number of shipping containers, samples sent, and carrier.

Logbooks become a permanent part of the documentation for the project. At the completion of field activities, they will be delivered to the URS Project Director and will be placed in the project files maintained in the URS Appleton Office.

4.2 SAMPLE NOMENCLATURE

The sample numbering system for field sample collection will utilize a two-letter project identification code followed by a sample code and a location code. For this RI, the project location code will be NS (for NSP). The matrix code or sample type code will be an alpha code corresponding to the sample type as follows:

AA	Ambient Air	Vapor Intrusion Samples
AQ	Air Quality Control Matrix	Background Air Samples
DC	Drill Cuttings	Soil Cuttings for Disposal
GS	Soil Gas	Soil Gas from Vapor Probes
LF	Free-phase Product	Free-Phase Coal Tar
SE	Sediment	Sediment Samples
SO	Soil	Surface/Subsurface Soil Samples
SQ	Soil/Solid Quality Control Matrix	Duplicate Soil samples
TA	Animal Tissue	Animal Tissue from Chequamegon Bay
TQ	Tissue Quality Control Matrix	Duplicate Tissue Samples
WG	Groundwater	Groundwater Samples from Monitor Wells
WP	Drinking Water	Water Samples from Artesian Wells
WQ	Water Quality Control Matrix	Duplicates, Field Blanks, and Trip Blanks

The location code will follow the sample type code and will consist of a two to five-digit numeric or alpha-numeric code that indicates the sample location. Location codes lower than 10 will be preceded by a '0' (e.g. 01, 02, etc.). For groundwater samples, the location code will be the monitoring well number. Geoprobe soil samples, surface soil samples, field blanks, and trip blanks will use a consecutive numbering system. For subsurface soil samples, the location code will be followed by the depth of the sample. Samples collected from one location more than one time (e.g. quarterly groundwater samples, soil gas samples) will have a date code following the location code. The date code will consist of four numbers, a two number month and two number year corresponding to the month and year the sample is collected. Examples of sample identification numbers would be:

- NS-GW-MW10-1203, for NSP site, groundwater sample from monitoring well MW-10 in December 2003.
- NS-SBGP01-2-4, for NSP site, subsurface soil sample from Geoprobe Boring 1 at a depth of 2-4 feet below ground surface (bgs)
- NS-SS03, for NSP site, surface soil sample from location number 3

4.3 SAMPLE SHIPPING

Environmental samples will be shipped via an overnight courier service, with delivery specified for the following morning. The field manager should contact the laboratory ahead of time to inform laboratory personnel of the number of samples, analytes, courier service, and other pertinent information to ensure the integrity of sample results. Samples will be shipped in a manner to guarantee delivery to the laboratory before hold times expire. Analytes that have specific temperature requirements (i.e. 4° C) will be shipped in a cooler with ice. Procedures for shipping environmental samples are detailed in SOP 210.

Whenever possible, samples from discreet locations will be shipped in the same cooler or package. Sample containers should be placed upright and packed in a manner to prevent breakage. When ice is used, it should be double bagged to prevent leakage and placed on top of the sample jars. Any voids remaining in the cooler should be filled with cushioning materials. The chain of custody will be placed in a waterproof plastic bag and taped to the interior lid of the cooler.

The lid of the cooler or package will be secured by a two to three wraps of strapping tape in a minimum of two locations. A numbered custody seal will be placed spanning the lid and body of the cooler and covered with clear tape. The shipping label will be attached to the top of the package.

The analytical laboratories' addresses and SITE Project Managers are as follows:

Northern Lake Service, Inc
400 North Lake Avenue
Crandon, Wisconsin 54520
Phone: (715) 478-2777
Contact: Mr. Steve Mlejnek

STL Knoxville
5815 Middlebrook Pike
Knoxville, Tennessee 37921
Phone: (865) 291-3000
Contact: Ms. Jamie McKinney

5.0 DECONTAMINATION

5.1 STANDARD PROCEDURES

A decontamination area for sample preparation equipment will be established within or near the boundary of the Exclusion Zone (EZ). The EZ is defined as the area where contamination is either known or likely to be present, or because of activity, will potentially harm personnel. Entry into the EZ requires the use of personal protective equipment.

A personnel decontamination station will be established outside and adjacent to the EZ. All personnel will proceed through the appropriate contamination reduction sequence upon leaving the EZ. All personal protective equipment will be left on-site during any breaks after performing decontamination procedures.

5.2 DECONTAMINATION OF EQUIPMENT

To maintain clean working conditions and control the quality of the collected samples, proper equipment decontamination procedures will be followed during all field activities. For groundwater sampling, dedicated or disposable sampling equipment will be used whenever possible to minimize the potential for cross-contamination. Decontamination procedures will be performed in accordance with SOP 190. Heavy equipment decontamination procedures are outlined in SOP 220. Decontamination activities will be documented in the field notebook.

5.2.1 Sampling Equipment

Sampling equipment requires special cleaning. Decontamination of all sampling equipment will be performed in accordance with the following procedure:

- Wash the equipment with a solution of Alconox and potable water. Additionally, circulate the solution through non-dedicated equipment, such as submersible pumps.
- Double rinse the equipment with distilled water. Circulate distilled water through equipment for a period of five minutes.

5.2.2 Tools

Tools used during sample preparation (i.e. mixing bowls, hand augers, split spoons, and spatulas) will be decontaminated in accordance with the following procedure:

- Remove all soil by scrubbing with a mixture of Alconox and potable water.
- Rinse with potable water.
- Double rinse with distilled water

5.2.3 Respirators

Certain parts of respirators, such as the harness assembly and cloth components are difficult to decontaminate. If grossly contaminated, they will be discarded. Rubber components can be soaked in soap and water and scrubbed with a brush. Individual owners of respirators are responsible for decontaminating and maintaining their own respirators.

5.2.4 Sanitizing Personal Protective Equipment

Respirators, reusable protective clothing, and other personal articles not only must be decontaminated before being reused, but also must be sanitized. The inside of masks and clothing becomes soiled because of exhalation, body oils, and perspirations. The manufacturer's instructions will be followed to sanitize the respirator mask. If practical, protective clothing will be machine washed after a thorough decontamination, otherwise, it will be cleaned by hand.

5.2.5 Heavy Equipment

Drill rigs and other heavy equipment are difficult to decontaminate. Generally, they are steam cleaned with water under high pressure and/or accessible parts are scrubbed with detergent/water solution under pressure, if possible. Particular care must be given to those components in direct contact with contaminants, such as tires, augers, or buckets. Before leaving the site, all heavy equipment will be inspected by the Field Manager to confirm the decontamination effort.

5.3 PERSISTENT CONTAMINATION

In some instances, clothing and equipment will become contaminated with substances that cannot be removed by normal decontamination procedures. A strong detergent (industrial grade) may be used to remove such contamination from equipment if it does not destroy or degrade the protective material. If persistent contamination is expected, disposable garments will be used.

5.4 DISPOSAL OF CONTAMINATED MATERIALS

All disposable and/or single–use materials and equipment used for decontamination must be disposed of properly. Clothing, tools, buckets, brushes, and all other equipment that is contaminated must be secured in drums or other containers and labeled. Clothing not completely decontaminated on-site will be secured in plastic bags before being removed from the site. Contaminated wash and rinse solutions will be contained and spent solutions will be disposed at the on-site treatment system.

5.5 MINIMAL DECONTAMINATION

Less extensive procedures for decontamination can be established when disposable clothing and equipment are used, the type and degree of contamination become known, or the potential for transfer is judged to be minimal by the Site Health and Safety Officer in consultation with the Project Manager.

6.0 INVESTIGATIVE DERIVED WASTE MANAGEMENT PLAN

Investigative derived wastes (IDW) will be generated during several phases of the RI at the Site. This section presents the methodology to be utilized for the storage and disposal of the wastes. Each investigative waste stream will require specific handling, storage and disposal procedures to ensure that potential adverse environmental impacts associated with the waste does not occur, and that all wastes are characterized and disposed in accordance with the provisions set forth in NR 600 of the Wisconsin Administrative Code and 40 CFR 261 of the Code of Federal of Regulations.

6.1 IDENTIFICATION OF INVESTIGATIVE DERIVED WASTE STREAMS

Four sources of investigative derived waste have been identified for the Site RI:

- Drilling spoils from soil generated during the installation of soil borings, water table monitoring wells and piezometers.
- Groundwater IDW from water table monitoring wells and piezometers includes all water generated during well development, purging, and sampling activities.
- Decontamination wastes from waste fluids generated during decontamination of field equipment, sampling equipment, and personal protective equipment.
- Personal protective equipment from disposable items such as gloves, Tyvek suits, etc. used to implement the health and safety program for the RI.

6.2 DRILLING SPOILS

Drilling spoil will be generated during the advancement of borings to obtain soil samples, and borings advanced to install water table monitoring wells and piezometers. The spoil will be handles as a waste product and appropriately disposed. Wells will be installed using hollow stem auger and mud rotary methods. Drilling mud generated will be stabilized with Portland cement or powdered bentonite and classified as drilling spoil.

The procedures for handling drilling spoil will consist of local accumulation at the drilling site, transfer to a 55 gallon drum, characterization, manifesting, and disposal. Each drum will be clearly labeled with the information necessary to identify the source areas of the drilling spoil and the dates of accumulation. Filled drums will be stored at the XCEL ENERGY storage yard, located north of St. Claire Street. This area is secured by a fence and locked gates to prevent access. Historic investigation activities have resulted in generation of similar wastes and characterization of this material by laboratory analysis has already been completed. A waste profile for these materials exists and all drilling spoils will be disposed as a special solid waste at Onyx's Seven Mile Creek Landfill in Eau Claire, Wisconsin.

Drilling spoils generated during this RI that are different (either physically or contaminant source area) from historic drilling wastes will need to be profiled separately. A composite sample will be collected from the drums of drilling spoil and submitted for laboratory analysis. The Landfill manager will determine what analyses are required to complete the waste profile.

6.3 WELL DEVELOPMENT AND PURGE WATER

Water table monitoring wells and piezometers development and purge water will be handled as a waste product and appropriately disposed. The procedures for handling development/purge water will consist of accumulation at the well or piezometer location in a bulk storage container. The bulk storage container should be periodically inspected to assure it does not leak. If a leak is observed, the container will be repaired or replaced.

All development/purge water will be disposed and treated at the on-site coal tar recovery system building. The development/purge water will be pumped directly into the surge tank located between the air diffuser and bag filters. Any water containing NAPLs will be pumped into the gravity separator. The water should be pumped at a rate as to not overload the treatment system. When not in use, the bulk storage container will be stored on-site next to the recovery system building. This area is secured by a fence and locked gates to prevent access.

6.4 DECONTAMINATION WASTES

Wastes associated with the decontamination of field equipment will consist primarily of liquids, with minor amounts of solids. The wastes will be generated by the cleaning of:

1. Soil boring and sampling equipment;

2. Heavy equipment (e.g. drill rig/backhoe);
3. Water table monitoring well and piezometer development equipment; and
4. Personnel exiting the exclusion zone around each sampling location.

Following generation, decontamination water will be placed in a bulk storage container. The decontamination water should be decanted during transfer to the bulk storage container as to minimize the amount of solids transferred. Solids present after decanting will be placed in drums and treated as drilling spoils. The decontamination water will be disposed and treated at the on-site coal tar recovery system building. Procedures for disposal of decanted decontamination water will be the same as disposal of development/purge water.

6.5 PERSONAL PROTECTIVE EQUIPMENT

Waste personal protective equipment (PPE) will be generated during RI activities. Spent waste PPE should be placed in a sealed 55-gallon drum and co-mingled with drilling spoils. Waste PPE that is free of NAPL can be stored in plastic garbage bags and disposed of in a general refuse dumpster.

7.0 SCHEDULE

7.1 SCHEDULE

A schedule for RI/FS tasks is provided in Appendix B.

8.0 REFERENCES

8.1 REFERENCES

United States Environmental Protection Agency. October 1988, Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA. Office of Solid Waste and Emergency Response. EPA/540/G-89/004.

United States Environmental Protection Agency. December 1987, A Compendium of Superfund Field Operation Methods. Office of Emergency and Remedial Response. EPA/540/P-87/001.

United States Environmental Protection Agency. January 1992, Guide to Management of Investigative-Derived Waste (IDW). Office of Solid Waste and Emergency Response. Publication 9345.3-03FS.

United States Environmental Protection Agency. March 2001, Guidance for Preparing Standard Operating Procedures (SOPs). Office of Environmental Information. EPA/240/B-01/004.

United States Environmental Protection Agency - Region IV. November 2001, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual.

TABLES

Field Sampling Plan – Ashland/NSP Lakefront Superfund Site

TABLE 1

RI/FS SAMPLING PROGRAM SUMMARY

Sample Matrix	Matrix Code	Location	Number of Samples	Rounds of Sampling	Field Duplicates	Eqpt. Blanks	MS/ MSD	Field Para-meters	Analytical Method	Laboratory Parameters	Analytical Method	Sample Preservation	Sample Container	Sample Holding Time
Surface Soil	SO	Upper Bluff/Ravine Area	12	1	2	1	1	VOCs	PID	VOCs	EPA 8260	MeOH, 4 deg. C	60-ml Amber glass	14 Days
										SVOCs	EPA 8270C	4 deg. C	60-ml Amber glass	14 Days
										Cyanide	EPA 335.4	4 deg. C	60-ml plastic jar	14 Days
										Chromium (+6)	EPA 7196A	4 deg. C	60-ml plastic jar	24 Hours
										All other metals	EPA 6010B/7471A	4 deg. C	60-ml plastic jar	6 Months
Geoprobe	SO	Upper Bluff/Ravine Area	114	1	12	6	6	VOCs	PID	VOCs	EPA 8260	MeOH, 4 deg. C	60-ml amber glass	14 Days
										SVOCs	EPA 8270C	4 deg. C	60-ml amber glass	14 Days
										Cyanide	EPA 335.4	4 deg. C	60-ml plastic jar	14 Days
										Chromium (+6)	EPA 7196A	4 deg. C	60-ml plastic jar	24 hours
										All other metals	EPA 6010B/7471A	4 deg. C	60-ml plastic jar	6 Months
Geoprobe Soil	SO	Kreher Park Area	20	1	2	1	1	VOCs	PID	VOCs	EPA 8260	MeOH, 4 deg. C	60-ml amber glass	14 Days
										SVOCs	EPA 8270C	4 deg. C	60-ml amber glass	14 Days
										Cyanide	EPA 335.4	4 deg. C	60-ml plastic jar	14 Days
										Chromium (+6)	EPA 7196A	4 deg. C	60-ml plastic jar	24 hours
										All other metals	EPA 6010B/7471A	4 deg. C	60-ml plastic jar	6 Months
Test Pit Soil	SO	Kreher Park Area	19	1	2	1	1	VOCs	PID	TCLP VOCs	EPA 8260	MeOH, 4 deg. C	60-ml amber glass	14 Days
										TCLP SVOCs	EPA 8270C	4 deg. C	60-ml amber glass	14 Days
										TCLP Cyanide	EPA 335.4	4 deg. C	60-ml plastic jar	14 Days
										TCLP Chromium (+6)	EPA 7196A	4 deg. C	60-ml plastic jar	24 hours
										TCLP metals	EPA 6010B/7471A	4 deg. C	60-ml plastic jar	6 Months
Ground-water	WG	Piezometers/ Monitoring Wells Site-Wide	65	6	7	2	4	See Table 2	See Table 2	VOCs	EPA 8260	HCl, 4 deg. C	3 - 40 ml Vials	14 Days
										SVOCs	EPA 8270C	4 deg. C	2 - 1 L amber jars	7 Days
										Cyanide	EPA 335.4	NaOH, 4 deg. C	1 - 250 ml plastic jar	14 Days
										Chromium (+6)	EPA 7196A	4 deg C	1-125 ml plastic jar	24 Hours
										All other metals	EPA 6010B/7471A	HNO3, 4 deg. C	1-125 ml plastic jar	6 Months
Drinking Water	WP	Artesian Wells in Kreher Park	2	6	QC sampling will be completed as part of the groundwater sampling program.			See Table 2	See Table 2	VOCs	EPA 8260	HCl, 4 deg. C	3 - 40 ml Vials	14 Days
										SVOCs	EPA 8270C	4 deg. C	2 - 1 L amber jars	7 Days
										Cyanide	EPA 335.4	NaOH, 4 deg. C	1 - 250 ml plastic jar	14 Days
										Chromium (+6)	EPA 7196A	4 deg C	1-125 ml plastic jar	24 Hours
										All other metals	EPA 6010B/7471A	HNO3, 4 deg. C	1-125 ml plastic jar	6 Months
Sediment/ Fish Tissue	SE/TA	Chequamegon Bay Inlet	A final sampling program for Area of Concern 4 will be completed following a reconnaissance survey, scheduled for late spring, 2004.											
Soil Vapor	GS	Upper Bluff/Ravine Area	7	2	-	-	-	-	-	TO-15	TO-15	None	6L Passivated SUMMA Canister	30 Days
Vapor Intrusion	AA	NSP Vehicle Maint. Garage	2	2	-	-	-	-	-	TO-15	TO-15	None	6L Passivated SUMMA Canister	30 Days

Field Sampling Plan – Ashland/NSP Lakefront Superfund Site

TABLE 2

QA OBJECTIVES FOR GROUNDWATER FIELD MEASUREMENTS

Parameter	Method Reference	Precision	Accuracy	Completeness
Standing Water Levels	Solinst	± 0.01 ft.	0.005 ft.	95%
Monitoring Well Water Temperature	E170.1, Electronic Temperature Probe	± 0.5 degrees C	1.0 degrees C	95%
Conductivity	E120.1, Electrometric	± 25 uhmo/cm^2	10 uhmo/cm^2	95%
pH	E150.1, Electrometric	± 0.1 pH units	0.05 pH units	95%
Turbidity	E180.1	10 NTU	0.5 NTU	95%
Dissolved Oxygen	ASTM - A4500	± 0.05 mg/L	± 0.1 mg/L	95%

FIGURES

APPENDICES

APPENDIX A

FIELD STANDARD OPERATING PROCEDURES

APPENDIX B

RI/FS SCHEDULE